

Deadline: _____

Calculus 2

Integration Project

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Directions: Copy all finished work neatly onto paper. Put the finished problems *in order* and staple the work together with this page when you hand in.

All work must be done neatly with detailed explanations. That includes defining u when making substitutions, and showing u , du , v , and dv for any integration by parts. Write out each term for numerical techniques, etc.

You may check your work using calculators or computers but you must show each step of the calculation for full credit.

You may share ideas but you may not copy another student's work.

You may get help from the lab *on the techniques* but they may not work out any of these problems for you.

1. $\int \frac{1}{(x+1)\sqrt{x+6}} dx$

7. $\int \frac{1}{x^3-1} dx$

2. $\int_0^{\pi/4} \tan^2 \theta \sec^4 \theta d\theta$

8. $\int_{\pi/4}^{\pi/3} \sin^3 x \cos^3 x dx$

3. $\int_0^{\pi} \cos mx \cos nx dx$, where m and n are integers with $m \neq \pm n$.

9. $\int_0^{\pi/4} \sqrt{(1+\cos 4x)^3} dx$

4. $\int_0^{1/\sqrt{2}} 3x \tan^{-1}(x^2) dx$

10. $\int_0^a \sqrt{a^2-x^2} dx$

5. $\int e^{\sqrt{x}} dx$

11. $\int_{-\infty}^{\infty} \frac{e^{-x}}{1+e^{-x}} dx$

6. $\int \frac{e^{4x}}{e^{2x} + 3e^x + 2} dx$

12. $\int_0^1 \frac{2}{x\sqrt{1-x^2}} dx$

13. Use (a) Simpson's Rule (b) the Trapezoidal Rule, and (c) the Midpoint Rule with $n = 6$ to approximate π using the equation $\pi = \int_0^1 \frac{4}{1+x^2} dx$. Use the corresponding error bound formula to find the bound in the error for *one* of your approximations.

Take-Home Test – No help from the Learning Lab